

CLAIMS

What is Claimed is:

1. A method for pre-etching a semiconductor wafer prior to a chemical mechanical polishing (CMP) process to achieve a uniform polishing rate comprising the steps of:

providing a wafer process surface having a layer of an oxide of a metal overlying said metal to be chemically mechanically polished;

removing the layer of an oxide of the metal according to an etching process;

cleaning the semiconductor wafer to include the wafer process surface according to a wet cleaning process; and

chemically mechanically polishing the wafer process surface according to a CMP process including applying at least an abrasive slurry to the wafer process surface.

2. The method of claim 1, wherein the layer of an oxide of the metal is at least one of an oxide of copper, aluminum, and tungsten.

3. The method of claim 1, wherein the step of removing the layer of an oxide of the metal further comprises using a wet chemical etchant wherein the wafer process surface is subjected to at least one of dipping into the wet chemical etchant and spraying the wet chemical etchant onto the wafer process surface while simultaneously agitating the wafer process surface.

4. The method of claim 3, wherein agitating the wafer process surface includes at least one of megasonic energy and brushing.

5. The method of claim 3, wherein the wet chemical etchant is an aqueous basic solution with a pH of greater than about 10.

6. The method of claim 5, wherein the wet chemical etchant includes potassium hydroxide (KOH).

7. The method of claim 1, wherein the step of removing the layer of an oxide of the metal further comprises plasma etching the layer of an oxide of the metal according to a reactive ion etch process.

8. The method of claim 7, wherein the reactive ion etch process further includes igniting and maintaining a plasma including at least one of fluorocarbons and hydrofluorocarbons.

9. The method of claim 1, wherein the wet cleaning process comprises using deionized water wherein the wafer process surface is subjected to at least one of dipping into the deionized water and spraying the deionized water onto the wafer process surface while simultaneously agitating the wafer process surface.

10. The method of claim 1, wherein the CMP process further includes applying a polishing solution to the wafer process surface for forming an oxide layer in-situ over the metal.

11. The method of claim 10, wherein the polishing solution includes at least hydrogen peroxide.

12. The method of claim 1, further including a wafer process surface cleaning step following the step of chemically mechanically polishing.

13. A method for pre-etching a semiconductor wafer prior to a chemical mechanical polishing (CMP) process to achieve a uniform polishing rate comprising the steps of:

providing a wafer process surface having a layer of an oxide of a metal overlying the metal to be chemically mechanically polished; and

removing the layer of an oxide of the metal according to an etching process.

14. The method of claim 13, wherein the layer of an oxide of the metal is at least one of an oxide of copper, aluminum, and tungsten.

15. The method of claim 13, wherein the step of removing the layer of an oxide of the metal further comprises using a wet chemical etchant wherein the wafer process surface is subjected to at least one of dipping into the wet chemical etchant and spraying the wet chemical etchant onto the wafer process surface while simultaneously agitating the wafer process surface.

16. The method of claim 15, wherein agitating the wafer process surface includes at least one of megasonic energy and brushing.

17. The method of claim 15, wherein the wet chemical etchant is an aqueous basic solution with a pH of greater than about 10.

18. The method of claim 17, wherein the wet chemical etchant includes potassium hydroxide (KOH).

19. The method of claim 13, wherein the step of removing the layer of an oxide of the metal further comprises plasma etching the layer of an oxide of the metal according to a reactive ion etch process.

20. The method of claim 19, wherein the reactive ion etch process further includes igniting and maintaining a plasma including at least one of fluorocarbons and hydrofluorocarbons.